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Record of Decision:

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Record of Decision for Oak Ridge Associated Universities South Campus Facility Oak Ridge, Tennessee

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Prepared for U.S. Department of Energy
Office of Environmental Restoration and Waste Management

PREFACE

The Record of Decision for Oak Ridge Associated Universities South Campus Facility Oak Ridge, Tennessee (DOE/OR/02-1383&D3) was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act and documents the selected remedy. This work was performed under Work Breakdown Structure 1.4.12.5.1.01 (Activity Data Sheet 8390 "Oak Ridge Associated Universities"). Publication of this document meets a Federal Facility Agreement milestone of November 26, 1995. This document provides the Environmental Restoration Program with information about the no action remedy selected for the Oak Ridge Associated Universities South Campus Facility. While called "no action," this alternative actually entails periodic sampling and placement of a statement in the property title notifying potential owners of the contamination. Information in this document summarizes information from the remedial investigation/feasibility study (DOE/OR/02- 1274&D2, V1 and V2) and the proposed plan (DOE/OR/02-1310&D3).

ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
FS	feasibility study
ft	foot
gpm	gallons per minute
km	kilometer
L	liter
m	meter
:	microgram
MW	monitoring well
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORR	Oak Ridge Reservation
RI	remedial investigation
ROD	record of decision
TCE	trichloroethene
TDEC	Tennessee Department of Environment and Conservation
Y-12	Plant Oak Ridge Y-12 Plant

PART 1. DECLARATION

SITE NAME AND LOCATION

U.S. Department of Energy Oak Ridge Reservation Oak Ridge Associated Universities South Campus Facility Oak Ridge, Tennessee

STATEMENT OF BASIS AND PURPOSE

This record of decision (ROD) presents the selected remedial action for the Oak Ridge Reservation (ORR) Oak Ridge Associated Universities (ORAU) South Campus Facility in Oak Ridge, Tennessee. The action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 United States Code Section 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substance Contingency Plan (40 Code of Federal Regulations 300).

This decision is based on the administrative record for ORAU South Campus Facility, including the remedial investigation (RI)/feasibility study (FS) report (DOE 1995a), the proposed plant (DOE 1995b), and other documents contained in the administrative record file for this site.

This document is issued by the U.S. Department of Energy (DOE), Region IV of the U.S. Environmental Protection Agency (EPA), and the Tennessee Department of Environment and Conservation (TDEC). DOE is the lead agency for site activities. EPA and TDEC are supportive agencies as parties of the Federal Facility Agreement for this response action and concur with the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

This response action fits into the overall ORR cleanup strategy by addressing soil and groundwater contaminated with trichloroethene (TCE) at the ORAU South Campus Facility. Because the site poses no unacceptable current or future risk to humans or the environment provide the TCE-contaminated groundwater is not used as a drinking water source, DOE has selected a no action remedy for the site. The no action alternative includes periodic sampling to ensure that natural attenuation in the zone of contamination continues as expected. In addition, a statement will be placed in the property title notifying potential owners of the contamination. The monitoring and the title statement will provide, at a minimal cost, institutional controls that help ensure the site continues to pose no unacceptable risk.

DECLARATION STATEMENT

The no action alternative is adequate to ensure protection of human health and the environment as directed by CERCLA Section 121(b). However, 5-year reviews are required by CERCLA Section 121(c) because hazardous constituents will remain on site. The reviews will be conducted every 5 years until natural attenuation in the zone of contamination decreases TCE concentrations below regulatory levels of concern.

APPROVALS

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PART 2. DECISION SUMMARY

SITE LOCATION AND DESCRIPTION

The ORR ORAU South Campus Facility is southeast of the Oak Ridge Y-12 Plant (Y-12 Plant) at the intersection of Pumphouse Road and Bethel Valley Road on the eastern edge of ORR, approximately 32 km (20 miles) west of Knoxville, Tennessee (Fig. 1). The facility was an experimental station consisting of pasture area, several buildings, and wastewater treatment facilities. Buildings in the northwest area of South Campus Facility are still used, primarily as office and storage space. Hay is harvested from the pasture areas.

Following is a brief description of several aspects of the site. More site description details are found in the RI/FS (DOE 1995a).

In general, the site slopes southeastward toward Scarboro Creek embayment. The topography in the developed northwestern corner of the site has been modified by the installation of roads, buildings, and associated drainage control ditches and storm drain/sewer systems.

Riparian wetlands, ranging in width from about 1.5-9 m (5-30 ft), flank the entire length of Scarboro Creek. Emergent and wet meadow wetlands are found at the mouth of Scarboro Creek at Scarboro Creek embayment. None of the wetlands will be affected.

Scarboro Cemetery, on the western border of South Campus Facility, is the only known cultural resource on the site and will not be affected.

South Campus Facility is within the city limits of Oak Ridge, Tennessee. Oak Ridge has a population of 27,310. Industrial, residential, and office expansion of Oak Ridge has occurred in several directions, including toward South Campus Facility. Future growth in the area is expected.

Groundwater in the unconsolidated zone mimics the local topography and flows to Scarboro Creek embayment. Deeper groundwater flows in the strike direction of the bedrock.

SITE HISTORY

On November 21, 1989, EPA placed ORR on the National Priorities List under CERCLA. On January 1, 1992, a Federal Facility Agreement was implemented by DOE, EPA, and TDEC.

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The agreement provides a procedural framework and schedule for evaluating, prioritizing, and managing areas of contamination on ORR. The agreement specifies that CERCLA procedures be followed to evaluate and remediate contamination problems.

Originally, the Oak Ridge Institute for Nuclear Studies operated South Campus Facility. In 1966, the Oak Ridge Institute for Nuclear Studies became ORAU. In 1975, the name of the facility was changed to the Comparative Animal Research Laboratory. ORAU assumed control of the laboratory in 1981. Since its formation in 1992, the Oak Ridge Institute for Science and Education (ORISE) has managed South Campus Facility. In 1993, ORAU South Campus Facility was renames ORISE-Scarboro Operations Site. For consistency with previous CERCLA documentation, the site is referred to as South Campus Facility in this document.

South Campus Facility was originally an experimental station where radionuclide effects on animals were studied. Activities and buildings at South Campus Facility either supported

research on exposed animals or managed those animals before and after exposing them to radiation. South Campus Facility included pasture, barns, laboratories, mechanical buildings, surgical and necropsy rooms, carpentry shops, a steam power plant, storage areas, and wastewater treatment facilities and ponds. Potential contamination at South campus Facility was investigated because operations at these facilities may have resulted in the release of chemical and/or radioactive substances to the environment. Buildings in the northwest area of South Campus Facility are still used as office and storage space. Hay is harvested from the pasture areas. DOE intends to maintain control of this site for the foreseeable future.

ORISE still used the structures at the site. When the structures are no longer necessary, acceptance into the decontamination and decommissioning program will be considered if remediation is necessary.

Since 1988, the following investigative activities have been performed at South Campus Facility:

- 1988-five underground storage tanks and associated contaminated soil removed and treated;
- 1988-89-groundwater monitoring wells installed and sampled;
- 1989-scoping survey written and existing data reviewed;
- 1991-CERCLA site inspection conducted;
- 1993-CERCLA RI performed; and
- 1994-1995-groundwater monitored quarterly.

Using information from earlier studies and the RI field work, and RI report and an FS were developed concurrently and presented in a single document. The RI characterized contamination of the soil, groundwater, and surface water at South Campus Facility and concluded that the site poses no unacceptable current or future risk to human health or the environment. The FS presented the relative benefits of a range of potential remediation alternatives such that, in the event an unacceptable risk to human health or the environment was found, an appropriate remedial alternative could be selected and implemented. The proposed plan then presented DOE's determination that no action was necessary and solicited public comment on the determination. The "Responsiveness Summary" documents public comments received and DOE's response to the comments. The ROD documents the selected remedy for South Campus Facility.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and proposed plan were released for public comment May 27, 1995. The notice of the availability of these two documents was published in The Oak Ridger and the Knoxville News-Sentinel newspapers May 17 and 24, 1995. The administrative record file contains all the documentation DOE considered in selecting the remedial action for South Campus Facility. The administrative record file is available at the Information Resource Center, 105 Broadway Avenue, Oak Ridge, Tennessee 37830. A 30-day public comment period for the RI/FS and the proposed plan began May 27, 1995. The public was informed that a public meeting would be held, if requested. No meeting was requested, and the public comment period ended June 26, 1995. Two comments were received during the public comment period. They are addressed in the "Responsiveness Summary" of this document.

ORR SCOPE AND ROLE OF SOUTH CAMPUS FACILITY WITHIN THE STRATEGY

The goals of the ORR Environmental Restoration (ER) Program are to achieve compliance with environmental regulations that protect human health and the environment, and to reduce risks to human health and the environment that are results of contaminated, inactive disposal sites. Some of the operable units under the overall ER Program are on the ORR but not within the boundaries of the Y-12 Plant, Oak Ridge K-25 Site, or Oak Ridge National Laboratory. ORAU is responsible for two such operable units: South Campus Facility (the subject of this document) and Freels Bend Area.

All for the buildings remaining on the South Campus Facility are actively used by ORAU, now called ORISE, in support of their Oak Ridge Operations. All of the out-buildings, other than the main barn, have been demolished. There are no plans to demolish any buildings on the main campus.

This ROD addressed the area outside of the buildings. Future CERCLA activities may be conducted at this site in association with facility decontamination and decommissioning activities.

SITE CHARACTERISTICS

During the RI, soil, surface water, sediment, and groundwater were sampled and analyzed for contamination. Most compounds were near background levels. In addition, many chemicals were detected in a few samples. TCE was detected in soil and groundwater just east of a mechanical building in a 2,025 m^2 (22,400-ft^2) area approximately 1.6 m (5 ft) deep (Fig.2). No historical or facility operations records document the release of TCE or suggest the original source of the TCE. The nearby mechanical building has been used as a maintenance garage. TCE is an effective degreaser and may have been used at the maintenance garage. Detected groundwater TCE concentrations ranged from 380 to 1,400 :g/L. TCE concentrations up to 3 :g/L were detected in the shallow bedrock well at a depth of 23 ft bgs. Laboratory analysis has detected degradation products of TCE at the site, indicating that local environmental factors naturally degrade TCE. Due to the low estimated overall quantity of TCE, its ability to naturally degrade, and the slow rate of migration, TCE is not likely to emerge into surface water at concentrations above regulatory limits (DOE 1995a).

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Benzene was detected at low levels in the groundwater from one monitoring well. The well intercepted a bedding plane directly down-dip from the former location of the underground storage tanks that were removed in 1988. The location suggests the benzene is residual from the underground storage tanks.

Surface water at the site consists of Scarboro Creek, intermittent streams, drainage ditches, storm sewers, swine water ponds, and Scarboro Creek embayment. All of the features drain into Scarboro Creek embayment and eventually into Melton Hill Lake. Shallow groundwater emerges as wet weather springs near the embayment.

Groundwater at South Campus Facility is not currently used at the facility or at any nearby locations, and there is little potential for future residential use of South Campus Facility groundwater. Municipal water serves, and is expected to continue to serve, the site, further reducing the need for future residential groundwater use. DOE does not plan to relinquish control of South Campus Facility; consequently, residential development is not likely with the next 20 years. In addition, groundwater wells in the immediate vicinity of the TCE contamination could not be relied upon to meet minimum requirements for residential use (DOE 1995a). Therefore, the domestic use of groundwater at the site is an incomplete exposure pathway.

SUMMARY OF SITE RISKS

As part of the RI (DOE 1995a), a baseline risk assessment concluded that no unacceptable risk to human health or the environment is posed by contaminants identified in the sampling and analysis at South Campus Facility if groundwater within the TCE zone is not used as a drinking water source. The results are summarized in this section.

HUMAN HEALTH RISK ASSESSMENT

The human health risk assessment evaluated the potential for increased cases of cancer and other illnesses. Cancer risk is an estimate of the incremental increase in the probability that an exposed individual could develop cancer, based on an assumed frequency of exposure projected over a lifetime. Non-cancer risk for each contaminant of concern is estimated by dividing a calculated daily intake rate by the intake rate indicated in toxicity studies to cause adverse health effects.

The assessment of human health risk considered chemical and radiological contaminants across a range of conservative current and future exposure scenarios. Current users included outdoor maintenance workers and hay harvesters. Hypothetical future users included a full-time worker, recreational visitors, and residents.

At South Campus Facility, no current or future scenarios evaluated had unacceptable risk levels. The domestic use of groundwater at the site would result in unacceptable risk. However, as discussed in the Site Characteristics section, DOE has determined that this is an incomplete exposure pathway.

Table 1 summarizes the human health chemical risks at South Campus Facility.

Table 1. Summary of chemical carcinogenic risks and non-carcinogenic hazard indices for South Campus Facility, Oak Ridge, Tennessee

Receptor	Media	Location	Carcinogenic risk	Non-Carcinogenic hazard index
Current full-time employee	Soil	Throughout SCF	5 X 10-6	0.0004
	Soil	Main Campus	9 X 10-6	0.001
Maintenance worker	Soil	Drainage Ditch	5 X 10-6	0.01
	Sediment	Drainage Ditch	3 X 10-5	0.02
Current/future adult	Soil	Throughout SCF	8 X 10-6	0.0004
recreational user	Sediment	Scarboro Creek	3 X 10-5	0.001
	Soil	Drainage Ditch	8 X 10-6	0.0009
	Sediment	Drainage Ditch	4 X 10-5	0.001
Future adult resident	Soil	Throughout SCF	8 X 10-5	0.0005
Future child resident	Soil	Throughout SCF	3 X 10-5	0.01

Reference: DOE 1995a

SCF= South Campus Facility

According to EPA guidance, a total pathway risk that exceeds 1 X 10-4 or a hazard index that exceeds 1 indicates a level of concern in terms of exposure to a given medium. The risk assessment (DOE 1995a) concluded that surface water at South Campus Facility contains no contaminants of potential concern. Groundwater in the TCE area used as a drinking water source would result in a carcinogenic risk of 4 X 10-3 and a hazard index of 19. However, groundwater in the TCE area is not considered a drinking water source. Therefore, South Campus Facility has no unacceptable risk.

ECOLOGICAL RISK ASSESSMENT

The ecological risk assessment evaluated the potential environmental effects of site contaminants on wildlife expected to be present at South Campus Facility. The contaminants of concern for this remedial action determination, TCE and benzene in groundwater, do not present an unacceptable risk to wildlife or plants.

DESCRIPTION OF THE NO ACTION ALTERNATIVE

South Campus Facility poses no unacceptable risk to humans or the environment. Therefore, no remedial action is necessary to ensure protection of human health and the environment as directed by CERCLA Section 121(b). Pursuant to EPA Office of Solid Waste and Emergency Response Directive 9234.2-01/FS-4 (EPA 1994), there are no applicable or relevant and appropriate requirements for a no action alternative. The no action alternative includes periodic sampling to ensure that evaluations completed in support of the RI are accurate and that natural attenuation in the zone of contamination continues as expected. A notice of the contamination will be recorded with respect to the contaminated parcel in Anderson County property records. The monitoring and title statement will provide, at a minimal cost, an additional level of assurance that the site poses no unacceptable risk. A 5-year review is required by CERCLA Section 121(c) because hazardous constituents will remain on site. The reviews will be conducted every 5 years until natural attenuation in the zone of contamination decreases TCE concentrations below regulatory levels of concern. A description of planned sampling activities follows.

The sampling locations are indicated in Figure 2. MW-19 is about 10 m (30 ft) east of the northeastern corner of the mechanical building. It is the monitoring well in which the highest concentrations of TCE were found during the RI and quarterly groundwater monitoring. MW-19 is screened in the unconsolidated zone (< 10 ft bgs). MW-43a, MW-43b, and MW-43c comprise a well cluster in the bedrock approximately 53 m (1790 ft) downgradient (i.e., plant south) of MW-19. MW-43a is screened 13-23 ft bgs, MW-43b 55-65 ft bgs, and MW-43c 165-175 ft bgs. Collection of groundwater from these locations will document the decrease in TCE concentrations, is likely to show the maximum TCE concentration in the area at any given time, and will indicate the direction of TCE migration. Surface water will be collected from a ditch approximately 55 m (180 ft) downgradient of the MW-43 well cluster. Sampling of the surface water in the ditch must occur during the rainy season (i.e., January or February); otherwise, the ditch might be dry. The surface water sample will show whether an unacceptable level of TCE is emerging from the ground and flowing into Scarboro Creek embayment.

Samples will be collected from the five locations described previously once every 2 years as long as TCE contamination above acceptable levels is present. The first sampling event will occur during the rainy season closest to and within 2 years of the signing of this ROD.

The 5-year review will consider the results of the RI, the quarterly groundwater monitoring program, and the 2-year sampling events to assess the rate of TCE degradation.

The cost estimate for the no action alternative is presented in Table 2. Five-year and 30-year escalated (i.e., accounting for inflation) cost estimates are presented. The actual cost will depend on the time required for natural degradation to decrease TCE concentrations below regulatory levels of concern.

Table 2. Estimated 5-year and 30-year costs for South Campus Facility, Oak Ridge, Tennessee

Line item	5-year cost ($)	30-year cost ($)
Deed restriction	4,000	4,000
Sampling	5,000	37,000
Analysis	3,000	27,000
OREIS integration	4,000	33,000
5-year review(s)	2,000	13,000
Overhead	2,000	16,000
Contingency	7,000	45,000
Total cost	27,000	175,000

OREIS = Oak Ridge Environmental Information System

EXPLANATION OF SIGNIFICANT CHANGES

The proposed plan for South Campus Facility was released for public comment in May 1995. The proposed plan identified the no action alternative as the preferred alternative. DOE received two comments during the public comment period. DOE, EPA, and TDEC reviewed the comments and determined that no significant changes to the remedy, as originally identified in the proposed plan, were necessary.

REFERENCES

DOE (U.S. Department of Energy). 1995a. Remedial Investigation/Feasibility Study, South Campus Facility, Oak Ridge, Tennessee, DOE/OR/02-1274/D2&V1 and V2, Oak Ridge, TN.

DOE. 1995b. Proposed Plan for South Campus Facility, DOE/OR/02-1310&D3. Oak Ridge, TN.

EPA (U.S. Environmental Protection Agency). June 1994. Office of Solid Waste and Emergency Response Directive 9234.2-01/FS-4, "ARARs Q's and A's."

PART 3. RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

This "Responsiveness Summary" documents the formal public comments on the Proposed Plan for South Campus Facility (DOE/OR/02-1310&D3) and the DOE response to the comments. Two comments were submitted in writing during the 30-day public comment period that began May 27, 1995, and ended June 26, 1995.

The no action alternative presented in the proposed plan is now the selected remedy for South Campus Facility. This decision is based on the administrative record for South Campus Facility, including the RI/FS report (DOE 1995a), proposed plan (DOE 1995b), public comments, and other documents contained in the administrative record file for this site.

This "Responsiveness Summary" serves three purposes. First, it provides DOE, EPA, and TDEC with information about community concerns with the site and preferences regarding the preferred alternative presented in the proposed plan. Second, it demonstrates how public comments were integrated into the decision-making process. Third, it allows DOE to formally respond to public comments.

COMMUNITY PREFERENCES

DOE received two comments on the proposed plan. Both concurred with the no action selected remedy. However, the first commentor disputed DOE's claim that groundwater at the facility cannot be used for drinking water due to the low yields. He cited a groundwater spring west of South Campus Facility and historic records on groundwater use at a school that once existed on the site. The second commentor suggested format changes to the proposed plan. Since the proposed plan had already been finalized and released for public comment at the time the comment was made, it cannot be changed. DOE will consider the suggested format changes on future proposed plans.

INTEGRATION OF COMMENTS

The ROD clarifies that DOE focused on several factors in determining that no action is necessary to ensure protection of human health and the environment. These considerations are:

1. Groundwater wells in the area of TCE contamination have low yields and could not be relied upon to meet minimum requirements for residential use. The first commentor disputed this point. As stated previously, he cited a groundwater spring west of South Campus Facility and historical records on groundwater use at the school that once existed on the site. DOE investigated these points for clarification. Apparently a bedrock spring yielding 1-2 gpm is located west of the site. TCE is mainly in the unconsolidated zone. Migration through the unconsolidated zone is controlled by shallow groundwater flow, which mimics the local topography. Shallow groundwater near the TCE area flows south to the Scarboro Creek embayment. Therefore, it is unlikely TCE migration would impact the spring. There are no known bedrock springs on South Campus Facility. Verbal records indicate that the school used a groundwater well after it was rebuilt in 1939 until DOE assumed control of the site. No records exist on productivity of this well, and it is not known if the well could have met the minimum requirements for residential use. Regardless, DOE recognizes that these references are provided as examples of possible groundwater use within the same geologic formation. Therefore, the ROD clarifies DOE's remedial action decision focused on yields in the immediate area of TCE contamination and not on yields

in the entire region.

2. DOE concurs that data from a few groundwater monitoring wells are not sufficient to completely characterize groundwater flow in carbonate systems. As a result, DOE cannot absolutely guarantee that the groundwater at South Campus Facility will never be used as drinking water. For this reason, the selected remedy includes inserting a statement in the property title to alert any future site users to the TCE contamination and discouraging any future residential use of the groundwater should the property be removed from DOE control before the TCE is degraded to acceptable levels.

3. Municipal water currently serves, and is expected to continue serving, South Campus Facility.

4. DOE has no plans to relinquish South Campus Facility. Consequently, residential development is unlikely within the next 20 years.

5. Because hazardous constituents remain on the site, a 5-year review will be conducted to evaluate current site conditions.